

WHAT IS CLAIMED IS:

1. An output shaft locking device in a multi-clutch transmission in which a plurality of rotational mechanisms, each of which is formed by arranging a clutch and a shifting mechanism in series, is provided in parallel between a rotational power input shaft and a rotational power output shaft, comprising:

a locking control device which locks the rotational power output shaft by engaging a shifting gear in each of the shifting mechanisms of at least two of the rotational mechanisms and engaging the clutches of the rotational mechanisms having a shifting gear engaged by the locking control device.

2. The output shaft locking device in a multi-clutch transmission according to claim 1, wherein the shifting mechanism of the at least two of the rotational mechanisms electrically controls a change in a shift according to a shift operation by a driver.

3. The output shaft locking device according to a multi-clutch transmission according to claim 1, wherein the clutches of the at least two of the rotational mechanisms are engaged/disengaged electrically.

4. The output shaft locking device according to a multi-clutch transmission according to claim 1, further comprising:

an rotational power output shaft lock determining device which determines whether the rotational power output shaft can be locked, wherein the locking control device locks the rotational power output shaft when it is determined by the rotational power output shaft lock determining device that the rotational power output shaft can be locked.

5. The output shaft locking device in a multi-clutch transmission according to claim 4, wherein the multi-clutch transmission is a transmission in a vehicle, which transmits rotational power from a drive source to a wheel of the vehicle, and the rotational power output shaft lock determining device determines that the rotational

power output shaft can be locked when predetermined conditions are satisfied, the predetermined conditions including a condition that the rotational power from the drive source is not being transmitted to the rotational power input shaft and a condition that the vehicle is not running.

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6. The output shaft locking device in a multi-clutch transmission according to claim 5, wherein shifting gear engagement corresponding to a first speed is included in shifting gear engagement performed by the locking control device.

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7. The output shaft locking device in a multi-clutch transmission according to claim 5, wherein, when changing a shift speed, the multi-clutch transmission switches the shifting mechanism, which is included in the rotational mechanism that can realize a requested shift speed among the rotational mechanisms in which the clutch has been disengaged, to a gear ratio state corresponding to the requested shift speed, then disengages the clutch which is included in the rotational mechanism in which the clutch has been engaged so as to transmit the rotational power, and engages the clutch included in the rotational mechanism which can realize the requested shift speed, thereby changing the shift speed.

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8. The output shaft locking device in a multi-clutch transmission according to claim 7, wherein the shift change is performed according to a shifting mode selected by a shift operation mechanism operated by a driver, at least an automatic gear shift position, a manual gear shift position, a reverse position and a neutral position are provided for the shift operation mechanism, and the locking control device engages the shifting gear in each of the shifting mechanisms of at least two of the rotational mechanisms and engages each of the clutches of the rotational mechanisms when it is determined by the rotational power output shaft lock determining device that the rotational power output shaft can be locked and the shift operation mechanism is instructed to be in one of the automatic gear shift position, the manual gear shift position and the reverse position.

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9. The output shaft locking device in a multi-clutch transmission according to claim 8, wherein, in a case where the shift operation mechanism is instructed to be in the automatic gear shift position or the manual gear shift position,

when engaging the shifting gear in each of the shifting mechanisms of at least two of the rotational mechanisms, the locking control device engages the shifting gear corresponding to the first speed.

5 10. The output shaft locking device in a multi-clutch transmission according to claim 8, wherein, in a case where the shift operation mechanism is instructed to be in the reverse position, when engaging the shifting gear in each of the shifting mechanisms of at least two of the rotational mechanisms, the locking control device engages the shifting gear corresponding to reverse.

10 11. An output shaft locking method in a multi-clutch transmission in which a plurality of rotational mechanisms, each of which is formed by arranging a clutch and a shifting mechanism in series, is provided in parallel between a rotational power input shaft and a rotational power output shaft, comprising the steps of:

15 engaging a shifting gear in each of the shifting mechanisms of at least two of the rotational mechanisms; and

engaging the clutches of the rotational mechanisms having a shifting gear engaged by the locking control device, thereby locking the rotational power output shaft.

20 12. The output shaft locking method according to claim 11, wherein the shifting mechanism of the at least two of the rotational mechanisms electrically controls a change in a shift according to a shift operation by a driver.

25 13. The output shaft locking method according to claim 11, wherein the clutches of the at least two of the rotational mechanisms are engaged/disengaged electrically.

30 14. The output shaft locking method according to claim 11, further comprising the step of:

determining whether the rotational power output shaft can be locked.

15. The output shaft locking method according to claim 14, wherein the multi-clutch transmission is a transmission in a vehicle, which transmits rotational power from a drive source to a wheel, further comprising the step of:

5 determining that the rotational power output shaft can be locked when predetermined conditions are satisfied, the predetermined conditions including a condition that the rotational power from the drive source is not being transmitted to the rotational power input shaft, and a condition that the vehicle is not running.

10 16. The output shaft locking method according to claim 15, wherein shifting gear engagement corresponding to a first speed is included in shifting gear engagement performed by the locking control device.

17. The output shaft locking method according to claim 15, further comprising the steps of:

15 disengaging the clutch which is included in the rotational mechanism in which the clutch has been engaged so as to transmit the rotational power after switching the shifting mechanism, which is included in the rotational mechanism that can realize a requested shift speed among the rotational mechanisms in which the clutch has been disengaged, to the gear ratio state corresponding to the requested shift speed when
20 changing a shift speed; and

engaging the clutch included in the rotational mechanism which can realize the requested shift speed, thereby changing the shift speed.

25 18. The output shaft locking method according to claim 17, wherein the shift change is performed according to a shifting mode selected by a shift operation mechanism operated by a driver, and at least an automatic gear shift position, a manual gear shift position, a reverse position and a neutral position are provided for the shift operation mechanism, further comprising the steps of:

30 engaging the shifting gear in each of the shifting mechanisms of at least two of the rotational mechanisms when it is determined by the rotational power output shaft lock determining device that the rotational power output shaft can be locked and the

shift operation mechanism is instructed to be in one of the automatic gear shift position, the manual gear shift position and the reverse position; and

engaging each of the clutches of the rotational mechanisms.

- 5 19. The output shaft locking method according to claim 18, further comprising the step of:

engaging the shifting gear corresponding to the first speed when engaging the shifting gear in each of the shifting mechanisms of at least two of the rotational mechanisms in a case where the shift operation mechanism is instructed to be in the
10 automatic gear shift position or the manual gear shift position.

20. The output shaft locking method according to claim 18, further comprising the step of:

engaging the shifting gear corresponding to reverse when engaging the
15 shifting gear in each of the shifting mechanisms of at least two of the rotational mechanisms in a case where the shift operation mechanism is instructed to be in the reverse position.